

4.0 CRM METHODS

This section describes the methods that will be used by the U.S. Department of Energy (DOE) Richland Operations Office (DOE-RL) Hanford Cultural and Historic Resources Program.

4.1 RECORDS AND REPORTS

The DOE-RL Hanford Cultural and Historic Resources Program generates a variety of records and reports. Many records pertain to cultural resource sites and site conditions. Other records pertain to the administration of the cultural resource work conducted at Hanford. Occasionally work is substantive enough or important enough to warrant preparation of a formal presentation or report.

4.1.1 Cultural Resource Site Records

Each find of one or more features (non-portable, non-discrete artifacts) or of three or more artifacts within 50 meters (165 feet) of each other, depending on field observations, can be designated as an archaeological site and recorded in the files of the Washington State Office of Archaeology and Historic Preservation. All other objects will be designated as isolated finds (isolates). The Hanford Cultural and Historic Resources Program site forms will be filled out for sites following Washington State guidelines. Information to be recorded includes the following:

- Location of the site by legal description, universal transverse mercator coordinates, and verbal description
- Description of the site, its dimensions, and condition, including notation of modern anthropogenic disturbance and an estimate of how long ago the disturbance occurred
- Estimated depth of deposits
- Topographic, hydrologic, and ecologic context
- Number and density of artifacts and features
- Description and enumeration of artifacts, with special reference to temporally diagnostic specimens (temporally diagnostic items will be drawn)
- A scaled sketch map of the site and the location of important features or artifacts within it, the area of artifact distribution, and any modern anthropogenic disturbance. Maps also will show the location of the site with respect to surveyed grid markers, landforms, roads, and any other features that will aid in relocating the site.

A temporary number will be assigned to each site in the field, with the number indicating the resource type (i.e., “HT” = Hanford Temporary), the year, and a sequential number (e.g., HT-98-001). Generally,

no artifacts will be collected from sites during the survey process, except when auger testing or backhoe trenching is used or in instances when items are considered to be susceptible to unauthorized collection or the item is needed for interpretive purposes. Photographs documenting the site's extant condition will be taken to aid with future relocation and the site monitoring program. Photographs will include a setting overview, features, and temporally diagnostic artifacts. Copies of archaeological site forms will be submitted to the Washington State Office of Archaeology and Historic Preservation for final numbering, while forms will also be available to the tribes for their records. Site records will be maintained in database and hard copy. The database should be linked to geographic information system via universal transverse mercator coordinates for a site location map and reference to physical conditions in the project area.

4.1.2 Hanford Cultural and Historic Resources Program Records

The DOE-RL Hanford Cultural and Historic Resources Program records currently are maintained in two databases. The first details National Historic Preservation Act Section 106 reviews, the second tracks archaeological and historical projects. The structure for the former includes project number, client, contacts, date received, project description, and comments, among other entries. The latter documents the project number, contractor, principal investigator, description, location, research issues, methods, results, and recommendations. In both cases, these data should be linked to the geographic information system via universal transverse mercator coordinates for reference to a project map and physical conditions of the project area.

4.1.3 Other Cultural Resource Records

Two additional types of cultural resource records will be maintained. Recordation of isolated finds entails assigning a number in the form HI-year-sequence number (e.g., HI-98-001). The location of each isolate should be marked on a 1:24,000 scale topographic map with eventual entry of this information into the geographic information system database. Each isolate should be described on an Isolate Form, which will be maintained in hard copy with the project file and Isolate Record Log. In addition, isolate information should be entered into the cultural resources database with universal transverse mercator coordinates providing linkage to the geographic information system.

Isolates will be collected only when found in areas scheduled for surface modification or if they are in an area considered to be susceptible to unauthorized collection or the item is needed for interpretive purposes. Sufficient documentation, including photographs of the area surrounding the find, should be made at the time of the discovery to permit analysis. If isolates are temporally diagnostic, they should be photographed and drawn to scale.

Photograph logs are currently maintained in a database format that includes project number, roll and exposure number, description, and locational status. Photographs are numbered, as taken, by roll and frame on Photo Log forms. Roll numbers are sequential beginning in 1987. Hard copies of the forms are stored in a continuously maintained photographic log notebook. Computerized photograph data is linked to site and/or project databases, as appropriate, to facilitate retrieval of photo documentation of cultural resource management work for technical and summary reports.

Video logs are maintained in a video log notebook. The video log sheets itemize project number, date of recording, site number or interview title, video number, description, and locational status. Hard copies of the videotapes are cataloged in numerical order and stored with cultural resource records.

4.1.4 Cultural Resource Reports

As noted above, a variety of cultural resource reports are produced for studies at the Hanford Site, ranging from letter reports and memoranda to more substantial technical volumes of survey and excavation. For this discussion, only the latter will be considered here with respect to content and format.

4.1.4.1 Standardized Report Outline

The Washington State Office of Archaeology and Historic Preservation provides guidelines detailing the compliance-driven survey process and lists the organizational components and information necessary for the production of a professional archaeological report. The process of identification includes a number of activities that should be included, at appropriate levels, in a standard professional report (i.e., development of a research design, archival research, field survey, analysis, and reportage). Archaeological reports should contain, at a minimum, the following:

- Description of the study area
- Relevant historical documentation, paleoenvironmental and environmental data, and background research
- Research design
- Field operations, as actually implemented, including any changes or alterations from the research design and the reason for those changes
- All field observations
- Analyses and results, illustrated as appropriate with tables, charts, and graphs
- Evaluation of the investigation in terms of the goals and objectives of the study
- Sources, references, agencies, tribes, and informants contacted
- Information on the location of the original data in the form of field notes, photographs, and other materials.

4.1.4.2 Report Library

The DOE-RL holds a variety of published sources relating to the Hanford Site. Copies and originals of sources focusing on early archaeological work, Native Americans, Euro-American resettlement, and industrial development are shelved in the report library. In addition, a variety of technical reports, environmental analysis reports, and journal articles specific to Hanford history and prehistory are held in vertical files. Each source is assigned a unique number, is shelved or filed, and the reference citation is entered in a searchable electronic database to facilitate retrieval and creation of bibliographical listings.

4.2 INVENTORY

4.2.1 Archival Searches

Archival searches differ depending on the nature of the research being conducted and the resources likely to be encountered.

Archaeological and Traditional Cultural Site Records Search

Record searches for archaeological sites and traditional cultural places (TCPs) begin by determining whether an area in question has ever been surveyed for cultural resources; the survey met the minimum requirements of precision (as described below); cultural resources have been found; and those resources have been evaluated for and/or listed in the National Register. This is the first step in the identification process for National Historic Preservation Act Section 106 reviews.

Additional records and literature that may be reviewed include, but are not limited to, the cultural resource management project files, the archaeological site records file, published and unpublished reports on previous cultural resource surveys and excavations in the vicinity of the project site, quadrangle maps, historic maps, and county land-ownership records. In addition, other sources of information may be consulted. Complete copies of up-to-date archaeological site records and all survey and excavation reports for the Site are sent to HCRL and maintained in the repository. When a construction project is planned for an area known to have been settled by Euro-Americans during the pre-Hanford Site years, previous residents and/or local historians also may be consulted for information. The results of a literature and records search will be documented in the project file. The entry will be signed and dated by the author.

Information about TCPs or areas of concern to the tribes can only be obtained by direct communication with tribal representatives. For this reason, in cases of projects in known culturally sensitive areas, a copy of the Request for Cultural and/or Ecological Resources Review is to be faxed by the cultural resource specialist to each of the tribes upon receipt from the project manager or designee.

The results of the literature and records search will be documented in the project file by the cultural resource specialist.

Historic Archaeological Sites Records Search

Methods and techniques for identifying historic archaeological resources differ from those used to identify prehistoric archaeological resources. Methodological requirements established for the Hanford Site have been adapted from those recommended by the Association of Historical Archaeologists of the Pacific Northwest (<http://www.spiretech.com/~lester/ahapn/index/index.htm>). The approach for identifying historical archaeological resources is initiated with a historical methodology to establish the existence of known and potential historical resources within a given project area before fieldwork. This involves a more exhaustive review of historical documents than can be done for pre-contact sites. Previous experience indicates that a well-prepared historical background can identify potential site locations for upwards of 90 percent of the historical archaeological sites and historical structures within a project area (depending upon the amount of ground cover in the area) for approximately 10 percent of the cost for a full field survey. Hanford is no exception.

Initial documentary examination for a Hanford project area shall consist of a review of a variety of documents, including the following:

- DOE records of government property purchases from the 1940s
- Federal property records, available from the Bureau of Land Management state and regional offices indicating ownership transactions for federal lands converted to state or private ownership, patent, or lease
- U.S. Geological Survey quads and county maps
- Early aerial photographs older than 50 years
- General Land Office maps and surveyor notes.

When a project is planned for an area known to have been settled by Euro-Americans before establishment of the Hanford Site, previous residents and/or local historians also may be consulted for information.

To assist in identification of historical archaeological sites in the field, locations of historical structures obtained from historical sources are transferred to overlays of modern U.S. Geological Survey 7.5-minute quads or orthoquads, or to larger scale project maps, aerial photographs, or a computerized geographic information system compatible with ArcInfo. These locations consist of points, linear alignments, and areas that represent the potential locations of historical archaeological sites and historical structures. Attempts should also be made to obtain contour maps at the lowest increment possible, such as 1 meter (3 feet) or finer intervals; these are generally available for most areas at Hanford from one of the Site contractors. Other information sources such as soils or vegetation maps should also be incorporated to the extent possible. For reference purposes, these initial maps are referenced as potential historical resources overlays.

The results of the literature and records search will be documented in the project file. The entry will be signed and dated by the author.

If the project is found to have potential to effect historic properties, a notice is sent to the SHPO, Tribes, and if appropriate, interested parties identifying the project and the area of potential effect.

4.2.2 Ethnographic Fieldwork

Theory and Purpose

In 2000, HCRL initiated its oral history effort as part of a larger ongoing process for DOE to document the cultural landscapes represented at the Hanford Site. The Hanford Site comprises three cultural landscapes reflected by the groups that have contributed to its history. These are Native American, Early Settlers, and Manhattan Project/Cold War era landscapes. Within the context of a cultural landscape, HCRL's goal in conducting an oral history interview is to obtain insight on the intangible values associated with the elements that contribute to each landscape through time. For these reasons, interview questions are open-ended and cover topics that include the meaning of a place to that individual as well as descriptions of family history, lifeways, and historical events. Interviewees not only include individuals associated with these landscapes but also contemporary users of the Hanford Site. Sometimes interviews are completed to supplement archaeological and archival data on a specific resource threatened by natural and/or human forces. Together, this information is used to help make determinations of National Register eligibility, document TCPs, and for use in interpretive exhibits.

These kinds of interviews allow DOE to broaden the context of historical significance to include how a community associated with that resource values it. This approach provides a framework that assists DOE in fulfilling their federal historic preservation requirements and stewardship responsibilities. It is also useful as a framework for the development of a Hanford Site interpretive plan that is educational and meaningful to the public.

Methods

The HCRL oral history effort relies on a variety of ethnographic methods to get at the emic perspective (from the individual or community's point of view) on the meaning of a cultural resource, how the resource has been used through time, its place within the community's world view, as well as its historical value. For many cultural resources such as TCPs or areas of concern to tribes, information can only be obtained by direct communication with tribal representatives. The oral history effort applies this assumption to all of its cultural resources.

Treatment of Human Subjects. All oral history projects and informed consent forms are reviewed by the Human Subjects Institutional Review Board. As each group has different cultural concerns regarding the protection and release of information that they share in oral history interviews, informed consent forms are developed for each interview so they can be tailored to meet the needs of the research project and protect the interests of individuals being interviewed. Generally, the consent form informs the interviewee of the purpose of the research, how the program intends to use the information collected during the interview, and explains that the interviewee has the right to not share information or request

that certain information remain confidential. Interviewees are also given the option to release the interview to the program archives so that the information can be made available to the public for research and educational purposes.

Tape-Recorded Interviews. The program conducts tape-recorded interviews with individuals where open-ended questions are asked. The open-ended questions are structured in a way that allows the individual to explain things from their perspective. The interview usually lasts from 45 to 90 minutes, and takes place at a location chosen by the individual. Two copies are made of the original tape recording, one copy is given to the interviewee and the other is used to write a transcript. The original tape is reformatted onto a compact disk for permanent storage. Both are then stored in the program archives, which has restricted access. Interviewees are given the chance to review the transcript and make changes before the final transcripts are completed. A qualitative software program is used to analyze the interview data to look for common themes and disparities. These themes are coded and sorted.

Community Transect Walks. Visits to cultural resources locations can assist an interviewee's memory about events associated with that cultural resource. It also allows the interviewer to gain an understanding of how an individual perceives the resource spatially and cognitively. To accomplish this, the program takes non-Native American and Native American descendants as well as Hanford workers to visit onsite locations. As the group walks through the area, the interviewer has the interviewee provide a description of the place and events that come to mind. The activity is either video or audio taped, or the interviewer will take notes. Site visits are coordinated with the archaeologist and historian.

4.2.3 Structure and Facility Surveys

The programmatic agreement for the built environment on the Hanford Site includes stipulations and mitigation measures for buildings or structures selected to represent each property type in the Manhattan Project and Cold War Era Historic District (DOE 1996a). Exterior surveys of these buildings and structures were undertaken as the programmatic agreement was being developed. However, Stipulation V(C) of the programmatic agreement requires an assessment of the interior contents of historic buildings and structures to identify artifacts or objects that may have educational or interpretive value as exhibits within local, state, or national museums. Therefore, assessment walkthroughs may be required. The cultural resource specialist will need to coordinate this activity with the appropriate facility manager(s).

4.2.4 Archaeological Surveys

Archaeological survey methods differ depending on the nature of resources suspected to be located in the proposed survey area.

Pre-Contact Archaeological Surveys

Archaeological surveys conducted within the Hanford Site before 1987 varied considerably in the methods used. Most surveys were reconnaissance studies. When centralization of cultural resource

management activities began in 1987, however, a more consistent technical approach was adopted. Current surveys follow methods established in 1987 by the program and guidelines published by the Washington State Office of Archaeology and Historic Preservation. Still, there is flexibility to tailor methods to the scale and nature of the project, as well as the perceived sensitivity of cultural resources.

Although no systematic assessments have been conducted of the information recovered or lost as a result of differing survey strategies within various environmental zones, decades of experience and knowledge have established a standard that appears sufficient to identify most archaeological sites. As the archaeological site database grows, information on site size, location, contents, and deposition can be used to support or refine current survey methods for the environmental zones encountered on the Hanford Site.

Surveys conducted for long-term planning in compliance with Section 110 of the National Historic Preservation Act use parallel transect intervals of 20 meters (65.6 feet). An intensive survey entails pedestrian search of the entire area that may be impacted either directly or indirectly by a project, i.e., the area of potential effect. For most project work, parallel transect intervals of no more than 10 meters (32.8 feet) maintained by compass bearing are appropriate, with surveyors visually scanning the area 5 meters (16.4 feet) to either side of the transect line. For smaller linear project areas, 10- or 20-meter (32.8- or 65.6-feet) transects parallel to the area of potential effect may be used. Likewise, zigzag transects resulting in similar spacing may be suitable for some narrow, linear project areas.

Survey information and data encountered by surveyors are recorded on Hanford Cultural Resources Survey forms and/or in fieldbooks provided for this purpose.

In areas of poor ground visibility and/or apparent significant deposition, minimal shovel probing and/or auguring may be appropriate to identify potential subsurface cultural deposits. The spacing of these exposures should be based on the conditions prompting their use (i.e., vegetation or deposition), the sensitivity for cultural resources, and the nature of the proposed undertaking. In general, where ground surface exposure is less than 20 percent, such as in old fields colonized by non-native plant species, plant cover may be scraped from an area approximately 30 centimeters (1 foot) in diameter to expose mineral soil at intervals of approximately 5 meters (16.4 feet) along transect lines.

In areas where geomorphology indicates high potential for buried artifact deposits, subsurface tests should be conducted a maximum of 25 meters (82 feet) apart, excavating up to 2 meters (6.6 feet) deep using a 10-centimeter- (4-inch-) diameter bucket auger. Excavated sediment should be screened through 3 millimeter (1/8-inch) or 6-millimeter (1/4-inch) wire mesh, as soil conditions warrant. All shells, bones, and stone artifacts should be saved, while all fire-modified rocks should be counted, weighed, and discarded after recording. In areas of modern fill, backhoe trenches should be excavated as part of the reconnaissance effort if Holocene sediment deposits are suspected beneath the ground surface and the setting indicates a high potential for archaeological deposits. Subsurface test results should be recorded on the appropriate form.

Field survey methods selected for a specific project will vary depending on the nature of the project and area to be surveyed. In general, Hanford surveys of pre-contact archaeological resources should proceed in a two-step fashion, with an identification phase followed by a site recording phase. The advantage of this two-phased approach is that field surveyors can proceed through the survey area at a fixed rate,

briefly noting locations of resources on aerial photos and maps. Then, before returning to the field to record the resources, the project personnel can review the data and determine where site boundaries shall be drawn. In some cases, it may be more prudent to record the site when it is first encountered.

The DOE's philosophy towards defining site boundaries is to assign as many resources as possible to a site as long as there is reasonable justification to do so. For example, if there are several scatters of prehistoric materials identified within the same geomorphological unit, the scatters should be considered features or loci of one site. This is especially true if prehistoric materials are observable because the area has been disturbed (e.g., by wind erosion, animal burrowing, or vehicle disturbance).

Archaeological sites, associated features, and isolated finds shall be recorded using Hanford Site forms.

Historic Archaeological Surveys

The archaeological methodology used for inventorying historic archaeological sites consists of verification and documentation of potential historic resources identified during the historic background phase, and the identification of sites previously unknown from historical documents. Field survey methods will vary depending on the nature of the project and area to be surveyed. Contractors are referred to the guidelines developed by the Association of Historical Archaeologists of the Pacific Northwest (<http://www.spiretech.com/~lester/ahapn/index/index.htm>) for approaches that can be productive. As with prehistoric archaeological surveys, Hanford surveys of historic archaeological resources should also proceed in a two-step fashion, as described above.

During the identification phase, surveyors shall walk transects no more than 20 meters (65.6 feet) apart. One or two surveyors on a four- to five-person team should concentrate their efforts examining the landscape for cultural structures and above-ground cultural features, landforms, and disturbed ground. The remaining surveyors should concentrate their efforts on locating relatively small cultural sites and features at ground level (e.g., refuse scatters).

The DOE's philosophy towards defining site boundaries is to assign as many resources as possible to a site as long as there is reasonable justification to do so. For example, if there is a known farmstead in a location, all historic scatters in and around the farmstead that are consistent with the date and function of the farmstead would be included within the boundaries of that site, even though such association cannot be proven. A second example would be an isolated historic scatter adjacent to a road or trail; in this case, the scatter would not be a separate site but rather a feature of the road or trail.

Historic archaeological sites, associated features, and isolated finds will be recorded using Hanford Site forms. Site, feature, and artifact recording should conform to the guidelines provided by the Association of Historical Archaeologists of the Pacific Northwest. As explained in these guidelines, surface and often subsurface information must be collected during the site recording phase for the next step, evaluation, to be possible.

4.3 EXCAVATION

4.3.1 Test Excavations

Although minimal subsurface probes and/or augering may be conducted as part of reconnaissance efforts, this section focuses on recommended methods for more substantial testing and data recovery excavations. All proposed testing and data recovery excavations will address Archaeological Resources Protection Act and Native American Graves Protection and Repatriation Act requirements; the latter of which define necessary consultation and agreement with Native American tribes, should data recovery result in the intentional removal or inadvertent discovery of Native American cultural items.

Test excavations are impact-driven studies aimed at providing data necessary to evaluate sites for National Register eligibility. Such studies should, at a minimum, entail site mapping, surface collection within grids and/or point provenience for specific diagnostic artifact types, and excavations of one or more 1-by-1 meter (3.3-by-3.3 feet) to 1-by-2 meter (3.3-by-6.6 feet) excavation units. The scale of the work should be structured within the context of the proposed undertaking, anticipated materials present, and Native American consultation. Site-specific methods and research issues to be addressed should be presented in a research design.

Site mapping may vary from a simple sketch map to more detailed instrument mapping with contours and elevations. A permanent datum should be set into the site for this purpose and to establish a grid for subsequent phases of field work. The size of surface collection units should be based on the amount of material present on the surface and the types of research issues to be addressed.

For example, smaller units may be appropriate if deposits appear relatively undisturbed and intra-site patterning is to be explored. Likewise, the size of excavation units should be based on the proposed undertaking and the anticipated types of materials and/or features present. Larger exposures may be preferable when datable features are sought, while smaller units may be suitable where more dispersed areal sampling is desired. The number and placement of units should be based on the proposed undertaking and the nature of the site.

Excavation should be completed following cultural and/or natural strata, if discernible. Otherwise, excavation in 10-centimeter (4-inch) arbitrary levels is sufficient. All excavated sediment should be screened through 3-millimeter (1/8 inch) or 6-millimeter (1/4-inch) wire mesh, as soil conditions warrant, with all shell, bones, stone artifacts, and charcoal suitable for radiocarbon dating collected. Conversely, fire-modified rock should be counted and weighed, then discarded. Excavation unit level data should be recorded on Unit Level Records that include a scale map of the unit floor and summary descriptive observations on constituents and sediments. At the termination of excavation, at least one excavation unit sidewall should be drawn to scale to document the sediment profile and any feature exposed.

4.3.2 Large-Scale Excavations

Methods and procedures for conducting large-scale excavations generally correspond to those outlined for test excavation. In this case, however, excavation may be prompted by data recovery rather than

evaluation, and previous subsurface information may be available to tailor field methods and research issues to the site-specific characteristics. In these cases, larger subsurface exposures may be preferable, either in the form of larger individual unit size and/or from concentration of units within particular site areas. Likewise, previous excavation results and prevailing research issues may warrant more or less detailed recovery methods such as a change in screen mesh size, use of backhoe exposures for geomorphological investigations, or the collection of sediment samples for flotation analysis.

4.4 STRUCTURE AND FACILITY MANAGEMENT

4.4.1 Structure and Facility Documentation

Structures at Hanford are documented using the Historic Property Inventory Form (HPIF) provided by the Washington State Office of Archaeology and Historic Preservation. The DOE-RL has completed requirements for all Historic Property Inventory Forms at Hanford.

4.4.2 Structure and Facility Maintenance

The Manhattan Project/Cold War buildings that are still standing are maintained by the responsible program. Undertakings involving these buildings are subjected to cultural resource reviews, unless they are exempted under the terms of the programmatic agreement. The five pre-government buildings still standing are not maintained. The DOE-RL Hanford Cultural and Historic Resources Program has conducted condition assessments of them all and monitors their condition on a regular basis.

4.4.3 Structure and Facility Mitigation

The mitigation of the Manhattan Project/Cold War buildings has occurred, as described in Section 3. Five pre-government buildings have been evaluated and decisions need to be made regarding stabilization.

4.5 LABORATORY TREATMENT

The preferred practice is to record, analyze, and leave cultural materials in the field. However, if there is scientific value to the collections, protocol requires that materials be removed and studied under laboratory conditions. Following analysis and reporting, consultation with tribal representatives, interested parties, and the State Historic Preservation Office will occur to explore the appropriateness of reburial.

Three primary classes of materials will be collected when required: subsistence remains, lithic artifacts, and organic remains. Subsistence remains consist of fresh water mussel shell and bone. These materials provide information on diet, food preparation, and food disposal. Lithic artifacts include chipped stone tools and rough stone tools, which provide information on the types of materials selected for tools, tool use, tool kits, and tasks performed, and lithic reduction pieces and debitage, which provide information on

source materials, potential quarry locations, conservation of lithic materials, lithic reduction stages, percussion/pressure flaking, and how and where tools were produced. Organic remains include charcoal, organic-stained soils, and bulk soils. These materials provide information on age, environment, and site formation.

4.5.1 Processing

Preliminary artifact analyses typically will be conducted at the DOE-RL laboratory facilities at the Washington State University–Tri-Cities campus, unless the archaeological contractor has made acceptable arrangements elsewhere. Information will be recorded on a Summary Form. Diagnostic items should be drawn on a 1:1 scale on the form and photographed using a metric scale. Materials should be sorted, wet or dry washed (depending upon material), sized, weighed, and bagged by type for further analysis.

Sorting

Sorting is the initial step in processing. The contents of a collection unit (i.e., surface grid or excavation level) should be sorted by materials (i.e., lithic artifacts, soils, carbon, shell, bone) and set aside for further processing. All items should be placed in labeled plastic bags that clearly identify the provenience of the contents. If samples are to be sent for offsite analysis, for example, radiocarbon dating, faunal analysis, or soil grain analysis, labels should be firmly attached so they do not separate during transfer.

Washing

Wet washing will be conducted using cold water and a soft toothbrush. The purpose of washing is to clean the material to allow for unobstructed examination of surfaces and edges. Wet washing is suitable for all lithic artifacts, unless residue studies are anticipated. These items should be set aside for analysis. Wet washing for shell or bone is contingent upon the condition of these materials. If the materials are highly friable, wet washing could cause them to disintegrate and diminish their research potential. In these instances, dry washing using a soft toothbrush and light pressure, is preferable.

Sizing

Size classification will be conducted using preset templates marked on 10 by 10 to the inch graph paper (Dietzen Corporation, No. 341-10) delimited as follows:

Square Blocks (Lithic Flakes)

- <Size 1 – any piece too small for the Size 1 template
- Size 1 – 3 blocks by 3 blocks (~ 8 mm by 8 mm)
- Size 2 – 5 blocks by 5 blocks (~ 12 mm by 12 mm)
- Size 3 – 8 blocks by 8 blocks (~ 20 mm by 20 mm)

- Size 4 – 10 blocks by 10 blocks (~ 24 mm by 24 mm)
- Size 5 – 15 blocks by 15 blocks (~ 38 mm by 38 mm)
- >Size 5 – any piece too large to fit within the Size 5 template

Rectangular Blocks (Lithic Blades and Bone)

- <Size 1 – any piece too small for the Size 1 template
- Size 1 – 3 blocks by 6 blocks (~ 8 mm by 16 mm)
- Size 2 – 5 blocks by 10 blocks (~ 12 mm by 24 mm)
- Size 3 – 8 blocks by 16 blocks (~ 20 mm by 40 mm)
- Size 4 – 10 blocks by 20 blocks (~ 24 mm by 50 mm)
- Size 5 – 15 blocks by 30 blocks (~ 38 mm by 76 mm)
- >Size 5 – any piece too large to fit within the Size 5 template

Weighing

Weight will be recorded in grams using a professional laboratory-quality scale. The scale will be calibrated before each use to provide accurate measurements.

Bagging

All items should be placed in labeled plastic bags that clearly identify the provenience of the contents. At a minimum, this will include: site number, site name (if any), and surface collection grid coordinates or excavation level coordinates as appropriate.

4.5.2 Analysis

Shell Material

Wherever possible, nearly complete freshwater mussel shell halves (i.e., valves) or hinge pieces should be examined and the following variable states assessed: 1) side (dorsal, ventral); 2) location of broken edge (left lateral, right lateral, distal, proximal); 3) edge abrasion (present; absent, not recordable); 4) genus (*Margaritifera*, *Gonidea*); and 5) size (small, medium, large). To ensure replication, each valve should be oriented with the beak proximal (i.e., nearest the observer) and facing up so that proximal, left lateral, distal, and right lateral edges are established around the circumference of the valve. To keep inter-observer interpretation to a minimum, one analyst should examine all valves from a collection or series of collections.

Bone Material

Faunal remains should be examined and identified to the most specific taxonomic level possible (e.g., genus and species). However, when this is not possible and identification is only possible to class level (i.e., mammal, fish, bird, and reptile), mammal remains, in particular, should be categorized by size to maximize the identified portion of the remains. Generalized mammalian size classes are based on the weight and corresponding body sizes of living animals. There is some overlap in the weight ranges which delineate the size classes, as the weight ranges in the definitions are purposefully broad and contain recorded extremes rather than averages. These mammalian size classes only apply to land mammals. Four classes of mammal are employed for most analyses. These size classes are defined as the following (Olson 1983):

- Large: large ungulates that range in weight from 900 kilograms (1,984 pounds) (a large male bison) to 225 kilograms (496 pounds) (a small elk); taxa represented include bison, horse, cattle, moose, and elk.
- Medium: small ungulates and large carnivores that range in weight from 270 kilograms (595 pounds) (a large caribou) to 22.5 kilograms (50 pounds) (a small white-tailed deer); taxa represented include caribou, deer, mountain sheep, mountain goat, domestic sheep and goats, bear, wolf, and mountain lion.
- Small: most carnivores, large rodents, and rabbits that range in weight from 27 kilograms (60 pounds) (a large beaver) to 0.7 kilogram (1.5 pounds) (a small cottontail or marten); taxa represented include coyote or dog, bobcat, river otter, raccoon, marten, beaver, porcupine, marmot, muskrat, rabbit, and hare.

The fourth category, medium/large, is used for analysis when bone fragments that cannot be assigned with assurance to either the medium or large size categories.

The actual size of each bone examined should be recorded using the preset templates discussed in Section 4.5.1.

Information on both burning, and natural and cultural modifications to the specimen should be recorded. Four degrees or intensity of burning are recognized and recorded: 1) unburned, 2) partially burned, 3) burned, and 4) calcined. Partially burned is that bone which has sustained some exposure to heat which produces a color change (usually to red) or some partial charring. Burned bone specimens are completely charred. Calcined bone is that bone which has been burned to such a degree that the organic portion has been destroyed leaving only the inorganic, or mineral, fraction. Calcined bone is white to gray in color, blocky in appearance, and fairly regular in size. Calcined bone preserves better than unburned bone in certain environments, such as forests with acidic soil. Either cultural or natural forces can cause all of the three burned categories (Olson 1983).

Modifications that should be noted in analysis include both natural or non-human modifications (e.g., weathering and gnawing by carnivores or rodents) and cultural modifications caused by humans (i.e., impact fractures, cut marks, tools, and sawing).

Lithic Material

All chipped stone tools should be examined in a uniform manner. To ensure replication, each tool should be oriented with the bulb or percussion proximal and ventral (i.e., towards the analyst and down). This orientation establishes a dorsal and ventral face whenever possible. It also establishes proximal, left lateral, distal, and right lateral edges around the circumference of the tool. Where bifacial flaking had removed all evidence of the bulb, the less convex surface should be taken to be the ventral face. Each tool should be measured in centimeters to two decimal places (i.e., 2.37 centimeters) for maximum length, width, and thickness using a metric caliper. Cross-section information should describe the lateral cross-section of the tool from proximal to distal end, giving first the shape of the dorsal surface then the ventral. For example, a convex-plano cross-section indicates a tool with an excurvate dorsal surface and a flat ventral surface as viewed from the right lateral edge. Each utilized edge should be recorded separately so the number of tools may exceed the number of lithic pieces. To keep inter-observer interpretation to a minimum, one analyst should examine all tools from a collection or series of collections.

Debitage should be sorted by material type, classified, sized, and assigned to a reduction stage. Debitage is classified shatter, flakes, or blades. Blades are lithic reduction pieces that are fairly regular in shape and generally twice as long as they are wide. Flakes are usually amorphous or irregular in shape, and can assume any dimensions with respect to length and width. Shatter defines angular pieces ofdebitage generally lacking identifiable landmarks such as a striking platform or bulb of percussion. Debitage is sorted by size based on measurement using the pre-set templates discussed in Section 4.5.1. Flakes and blades should also be subclassified within their respective size categories as primary, secondary, or tertiary. Definitions are as follows:

- Primary – a flake or blade exhibiting cortex across all of its dorsal surface
- Secondary – a flake or blade exhibiting less than 100 percent cortex across its dorsal surface
- Tertiary – a flake or blade exhibiting no cortex across its dorsal surface

Rough stone tools should be measured in centimeters for maximum length, width, and thickness.

4.6 CURATION

With the exception of items that are in danger of looting or are of high interpretive or educational value, artifacts, objects, and materials encountered during field surveys or excavations will not be collected. Archaeological and historic-archaeological items are to be recorded, photographed, and analyzed in the field to the fullest extent possible. In those instances when collection is required, all items are to be fully point provenienced by mapping and recording their location in the field and protected during transport so damage does not occur. Cleaning, cataloging, and analyzing these items will follow established archaeological laboratory procedures. Items collected for retention will be delivered to the program for temporary or long-term curation (see the appendices for additional information).

For all buildings and structures relating to the operations of the Hanford Site through 1990, Stipulation V(C) of the Historic Buildings Programmatic Agreement requires an assessment of the interior contents of those properties listed for individual documentation within the Hanford Site Manhattan Project and Cold War Era Historic District Treatment Plan before any deactivation,

decontamination, or decommissioning activities (Marceau 1998). The purpose of the assessment is to locate and identify any artifacts (e.g., equipment, control panels, signs, models) that may have interpretive or educational value as exhibits within local, state, or national museums. Interior assessments of buildings determined to be contributing properties within the historic district, but not selected, as representatives of a building type or period of construction, will be conducted as funding allows. Procedures for the identification and disposition of items retained for curation are contained in Appendix C.

4.6.1 Preservation

Preservation at Hanford focuses on archaeological collections and Manhattan Project/Cold War artifacts found in buildings. All archaeological excavation materials recovered will be managed through both proper curation and appropriate conservation treatments.

The DOE-RL Hanford Cultural and Historic Resources Program has not faced substantive conservation issues to date. Archaeological materials are primarily stone, requiring no conservation. Bone, botanical, shell, and textiles appear stable and are not subjected to any special treatment. For new collections, conservation treatments are determined depending on the artifact's material and its condition; the best current standards in methodology and materials will be used. Documentation of all treatments used will become part of the permanent archive.

Artifacts associated with the Manhattan Project/Cold War have not to date required special conservation. Assessments of the collections are conducted regularly and as with the archaeological collections, conservation treatments will be determined depending on the artifact's material and its condition; the best current standards in methodology and materials will be used.

4.6.2 Inventory, Accession, Labeling, and Cataloging

Upon transfer of archaeological remains from the field to the laboratory, artifacts are inventoried, labeled, and cataloged. Cleaning is typically the first step to remove dirt and prepare the artifact for identification and analysis. All artifacts are cleaned unless this will harm the object or result in the loss of potential data (i.e., blood-residue analysis). Appropriate cleaning procedures depend upon the type and condition of the material. Due care is exercised during the cleaning process to ensure that the integrity and information value of the object is maintained.

Artifacts are labeled as soon as possible so that the site and intrasite provenience data are not lost. Labeling is done in a permanent and archivally stable manner, using commonly accepted methods. Where direct labeling on the object is not feasible, other archivally stable methods of permanently maintaining the relationship between an artifact and its provenience are used (e.g., archival quality resealable plastic bags).

When certain less-diagnostic artifact types occur in large quantities within a specific provenience, all specimens are typically not individually labeled. Examples include, but are not limited to, shell, fire-cracked rocks, flakes, window glass, brick, mortar, and ceramic and glass shards (exceptions include

unusual specimens or those of particular research potential). These artifacts may be grouped by material type and placed in a resealable plastic bag with the exterior permanently labeled. In the bag with less diagnostic artifacts, a Mylar or an acid-free paper slip labeled with the provenience information must be included. Other material classes not appropriate for individual labeling (i.e., floral remains, soil samples) are stored in suitable labeled containers with a labeled Mylar strip placed inside.

All faunal material is labeled, where practical. Bones too small for individual marking are placed in a labeled, resealable plastic bag. Bones within a provenience unit should be bagged separately by zoological class to prevent or reduce the crushing of fragile remains.

An explanation of the label information, including locational data about the excavation units, is submitted with the collection. One copy is stored with the site artifacts and one with the collection documentation. Once the collection has been inventoried, it is added to the catalogue of the permanent DOE-RL collections. In this manner, it is accessioned into the collection.

When new Manhattan Project/Cold War artifacts are located, typically during building walkthroughs, they are tagged with a label identifying them as an historic artifact (DOE 1997d). The artifact is then added to the catalogue of Manhattan Project/Cold War artifacts, noting the location and function and any special requirements. When the artifact is physically moved to a DOE-RL Hanford Cultural and Historic Resources storage facility, it is accessioned into the collection.

4.6.3 Identification, Evaluation, and Documentation

The identification, evaluation, and documentation of collections is accomplished according to commonly recognized archaeological and museum standards.

4.6.4 Storage and Maintenance

Archaeological collections are placed in archival-quality cardboard boxes in a locked cabinet. Temperature and humidity is recorded several times per day. Pest strips are placed around the storage area and checked quarterly.

4.6.5 Periodic Inspection and Remedial Preservation

An inventory of boxes housed in the collections repository is conducted annually. Box contents are spot-checked. The Manhattan Project/Cold War artifacts that have been identified by the program and still housed in operating facilities are inventoried every 2 years.

4.6.6 Study

Individuals or organizations interested in conducting studies on Hanford collections should contact the DOE-RL Cultural and Historic Resources Program Manager, who will consider the request in consultation with tribes and interested parties.

4.7 PRESERVATION

This section describes the DOE-RL Hanford Cultural and Historic Resources Program's approach to preserving in situ cultural resources. The program manage and maintain cultural resources located on the Hanford Sites in a way that considers the preservation of their historic, archaeological, architectural, and cultural values. To understand these values, DOE-RL consults with tribes and interested parties.

The general approach to ensure preservation of important cultural resources at Hanford is two fold. First, institute administrative procedures to ensure that program staff are aware of and review planned actions, or in the case of an emergency, are notified as soon as an emergency has occurred, which might have affected cultural resources (e.g., a fire). Second, the program maintains a long-term monitoring program that incorporates field visits to cultural resources and detailed recording of site conditions. Site information is analyzed to identify areas where action may need to be taken to mitigate impacts from natural and human forces.

4.7.1 Natural Forces

Erosion and fire are the primary natural force that impacts important cultural resources at Hanford. For erosion, the long-term monitoring task regularly checks places where sensitive cultural resources are located and where natural forces such as erosion have been observed. Erosion data are collected and analyzed on an annual basis. Information is collected on monitoring forms using procedures identified in Section 5. Analytical results identify those places where erosion is escalating, and based on these results and the density of cultural resources located in these areas, the problems are prioritized. The DOE-RL then consults with tribes and interested parties to determine if actions are needed, and if so, which action is preferable.

Also within the long-term monitoring task is a quantitative monitoring element. Two archaeological sites have been selected to collect data about river and wind erosion. Monitoring stations have been established to enable collection of quantified data concerning changes occurring at these sites from natural forces. Analyses of these data will occur in fiscal year (FY) 2004.

To address the threat of fire, the Hanford Fire Department has been instructed to notify program staff as soon as possible once a fire has been reported. A list of cultural staff with office and home phone numbers is maintained by the dispatcher and used when a fire occurs. Upon being notified, cultural staff check the cultural resource database and determine if resources are known or likely to be located in or adjacent to the fire location. If so, guidance is provided to the fire response team about areas to avoid in fire mitigation efforts, if possible. If necessary, cultural staff will travel to the fire command center and work directly with the fire command team.

A final effort undertaken to address the threat of fire is the acceleration of work associated with historic sites located at Hanford. These sites contain many artifacts and features that would be destroyed if a fire occurred in these areas. The Program is accelerating efforts to document those sites in the areas with the highest threat of fire.

4.7.2 Human Forces

Human forces have the potential to effect important cultural resources at Hanford both through authorized and unauthorized actions.

4.7.2.1 Authorized Actions

The DOE-RL Hanford Cultural and Historic Resources Program requires that all Hanford projects submit cultural resource review requests to the program so that compliance reviews can be performed. The DOE-RL reviews the proposed project, consults with tribes and interested parties, and identifies any actions needed to ensure protection of important cultural resources. The long-term monitoring program also monitors places where sensitive cultural resources are located and where authorized actions routinely occur.

4.7.2.2 Illegal Acts

Law enforcement at Hanford is handled by the Hanford Patrol and the Benton County Sheriff's Office. The Sheriff's Office patrols the Columbia River by boat. In addition, a law enforcement officer from U.S. Fish and Wildlife Service patrols portions of the Hanford Reach National Monument but reports violations on the DOE side of the river. The long-term monitoring program notes areas where looting or recreational activities have caused impacts. Where significant impacts are observed, they are referred to the Program Manager for action.

4.8 OUTREACH

Outreach for the DOE-RL Hanford Cultural and Historic Resources Program involves an assortment of efforts, ranging from phone calls to transmittal of reports to technical discussions among technical staff to government-to-government discussions. This section identifies the various consultation-related activities coordinated by DOE-RL's Hanford Cultural and Historic Resources Program.

4.8.1 Activities on the DOE Site

Tribal Issues Meetings

The DOE-RL Hanford Cultural and Historic Resources Program meets with tribal cultural resource staff on a regular basis. The purpose is to provide an informal intertribal/DOE consultation forum for discussing technical issues concerning cultural resource compliance. The forum represents a building block for consultation. Certain topics discussed may need to be followed up with official documentation to the appropriate tribal official to initiate or continue formal consultation.

Issues Exchange Meetings

The DOE-RL Hanford Cultural and Historic Resources Program intends to meet with non-tribal parties with interests in cultural and historic resources on a regular basis. The purpose is to provide an informal consultation forum for discussing technical issues concerning cultural resource compliance. The forum represents a building block for consultation with interested parties. Certain topics discussed may need to be followed up with official documentation to the appropriate representative to initiate or continue formal consultation.

4.8.2 Activities Not on the DOE Site

The Columbia River Exhibition of History, Science and Technology provides educational programs designed to encourage students in the pursuit of science and technology and to highlight the role of science and technology in shaping the history of the pre-Hanford era, Manhattan Project, and Cold War era. Programs are also initiated and offered for the community relating to the Hanford Site and the immediate area of the Columbia Basin. All educational or outreach programs are intended to expand the scope of exhibits found in the museum.

4.9 INTRAGENCY INFORMATION EXCHANGE

A U.S. Department of the Interior questionnaire is completed each year that details the accomplishments of the DOE-RL Hanford Cultural and Historic Resources Program.